

## Department of Water Resources

# Identifying Fish Migration Improvement Opportunities in the Central Valley Flood Management System

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Technical Workshop C2:  
Stressors to Ecosystem Processes  
West Sacramento, California  
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**PUBLIC SAFETY**

**ENVIRONMENTAL STEWARDSHIP**

**ECONOMIC STABILITY**

# Outline

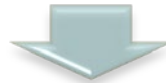
- Introduction
- Goals
- Background
- Stressors
- Examples
- Report (In progress)
- Next Steps

# Goals

- Instream water management structures can adversely affect fish migration within the Flood Management System.
- DWR has inventoried instream water management structures and identified fish migration improvement opportunities within three CVFPP Conservation Planning Areas.
- The information can be used to support multiple planning processes and to identify one or more ecosystem enhancements.

# Background

## The Central Valley Flood Protection Act of 2008



## Central Valley Flood Protection Plan (CVFPP) 2012

Conservation Framework

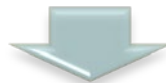
Attachment 9C: Fish Passage Assessment

## Central Valley Flood Protection Plan (Update) 2012-2017

Basin-Wide Feasibility Studies

Conservation Strategy

Regional Planning



## Fish Migration Improvement Opportunities

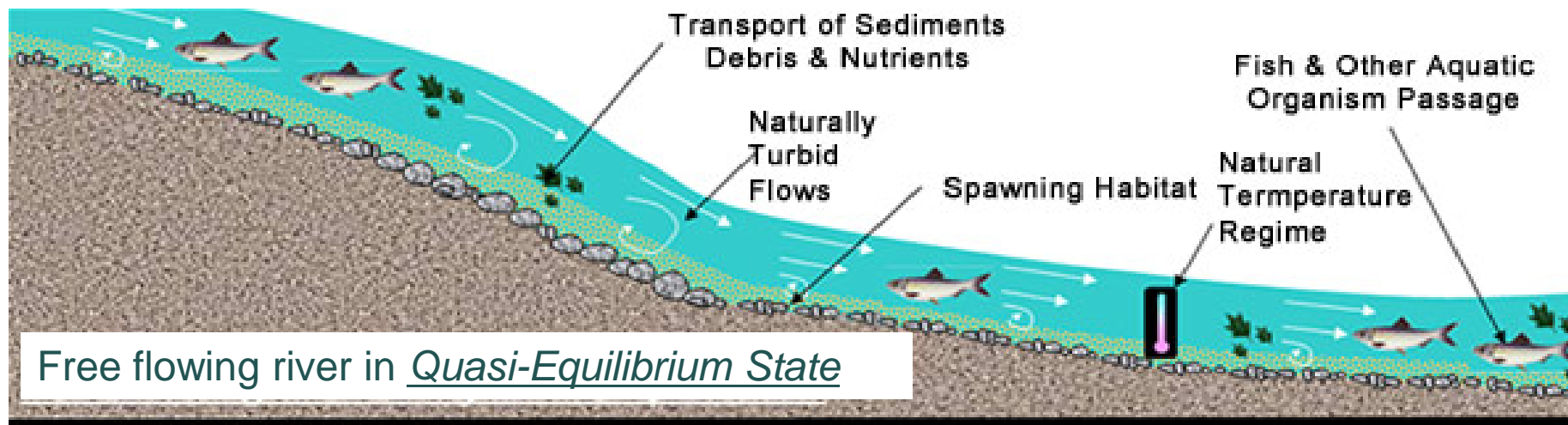


# Background

- CVFPP Volume V Attachment 9C: Fish Passage Assessment (June 2012).
- Draft Snapshot Report.
- Identifying Fish Migration and Passage Improvement Opportunities In the Central Valley Flood Management System (In progress).

# Attachment 9C – Fish Passage Assessment

- CVFPP Volume V Attachment 9C: Fish Passage Assessment (June 2012) <http://www.water.ca.gov/cvfmp/documents.cfm?sort=date>
- 189 potential fish migration barriers in the Systemwide planning area.
- Barriers affect approximately 4,000 miles of fish habitat.
- Other important information in 9c:
  - Reasons for the Decline in Anadromous Fish Populations
  - Floodplains are Important to Fish
  - Fish Stranding locations
  - Listed Anadromous Fish Within the Systemwide Planning Area
  - Technologies for fish passage
  - Prioritization of migration barriers



### UPSTREAM IMPACTS\*

Reduced:  
Natural Function, Water Quality, Oxygen, Turbid Flow, Circulation, Available Habitat  
Rivers ability to adjust horizontally and vertically (reduced resilience to change)

Increased:  
Pollutant Accumulation, Stratification, Temperatures, Algae Blooms

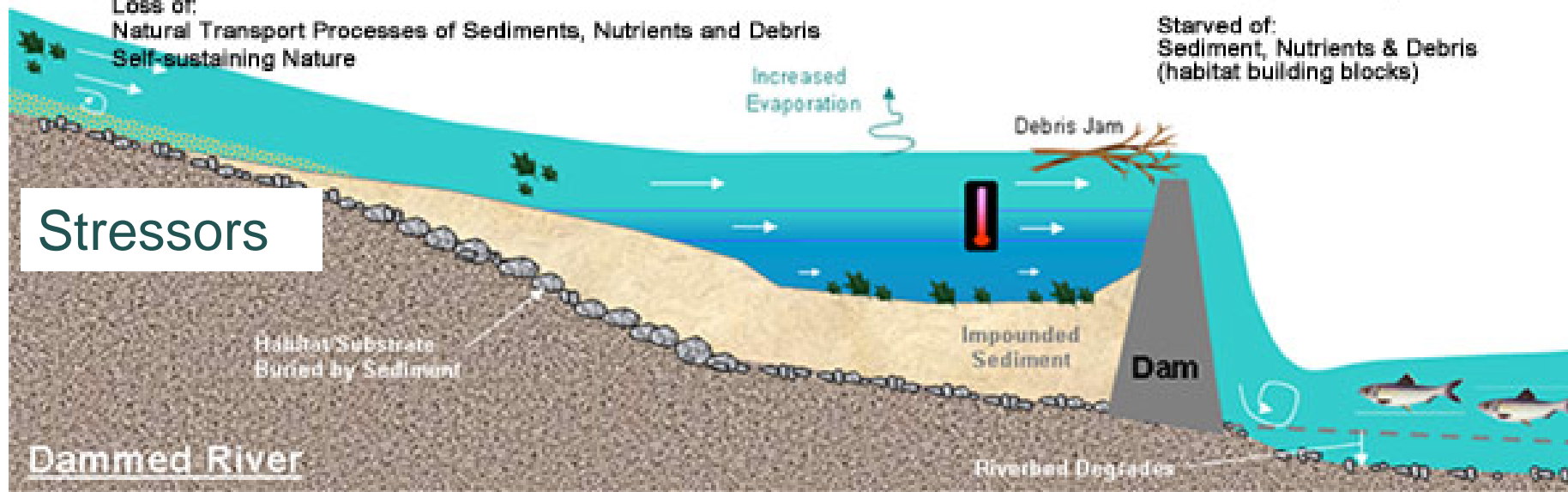
Loss of:  
Natural Transport Processes of Sediments, Nutrients and Debris  
Self-sustaining Nature

### DOWNSTREAM IMPACTS\*

Reduced:  
Water Quality & Riverbed Elevation

Altered:  
Flow Regime & Temperatures

Starved of:  
Sediment, Nutrients & Debris  
(habitat building blocks)



# Definitions

- **Fish Migration/Passage** - theoretical differences in terms that are important to consider.
- **Fish migration** (In-Migration and Out-Migration) - Is a biological term that refers to necessary fish movement throughout species life cycle.

Species and Runs	Adult Immigration	Adult Holding	Typical Spawning	Egg Incubation	Juvenile Rearing	Juvenile Emigration
Winter-run Chinook salmon	Dec – July	Jan – May	April – Aug	April – Oct	July – March	July – March

- **Fish passage** – is an engineering term that often refers to developing a solution to address fish migration impacts at a single location (e.g. dam or weir).
- **Fish migration impacts** - Are direct or indirect effects on fish movement resulting from the manipulation of waterway natural functions. These are the stressors to fish.



# Tisdale Weir



# Other Examples



**Weir No. 2 along the East Borrow Canal of the Sutter Bypass. (DWR)**



**Sacramento Weir with American River in background. (DWR)**



# Goals of our work

- Identify fish migration improvement opportunities in the Flood Management System.
- Promote the integration of ecosystem enhancement actions.
- Provide project specific planning information at identified structures. (e.g. species life history, structure problem statement)

# Methods and Data Sources

- Reviewed agency reports, biological opinions, internal memos, journal articles, passage reports, flood documents, and bulletins.
- Interviewed field staff that are familiar with site specific information.
- Interviewed DFW personnel that conducted fish rescues at sites.
- Reviewed and updated California Fish Passage assessment Database (PAD).
- Reviewed CVFPP Attachment 9c.

# What's Notable?

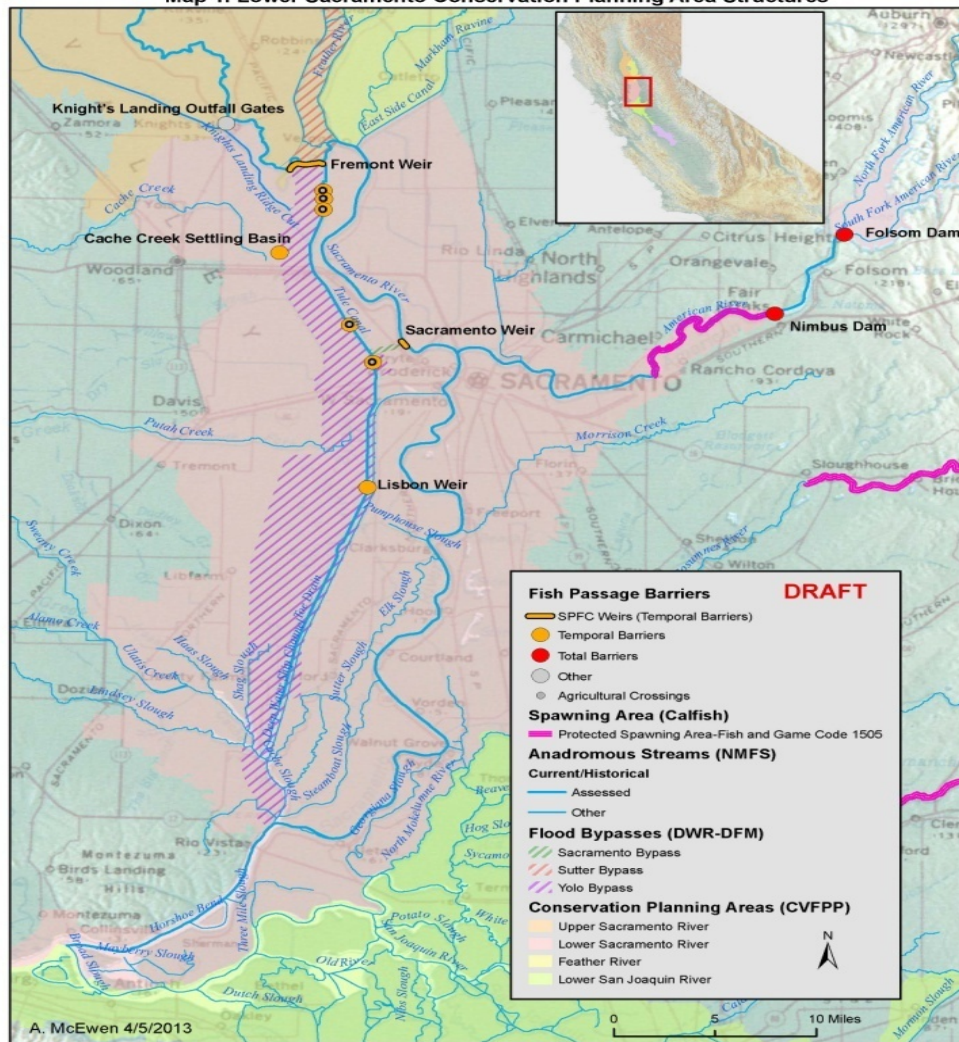
- More than 30 fish migration improvement opportunities at locations within the three Conservation Planning Areas.
- Information can be used as a basis for discussion with stakeholders.
- Data and information to integrate ecosystem enhancement actions within flood projects for planning.
- Use data and information to formulate comprehensive projects will help satisfy multiple goals of the CVFPP and Basin-Wide Feasibility Studies.

# What's Notable?

- Recent Prioritization: (1) Impediment frequency (channel hydrology, barrier status), (2) Barrier intensity (species presence/diversity, barrier location in the river), (3) Upstream habitat (miles of waterway, type of upstream habitat).
- Attachment C Prioritization: (1) Bio importance - NOAA Fisheries 2009 species recovery priority actions. (2) Linkage to SPFC facilities - Prop 1E ; (3) Geo location - NOAA Fisheries 2009 geographic priorities; and (3) NOAA Fisheries OCAP Biological Opinion deadlines.
- Other work CalFish Passage Forum - APASS Optimization Model

# Three Conservation Planning Areas:

Map 1. Lower Sacramento Conservation Planning Area Structures



Upper Sacramento, Feather River, and Lower Sacramento Planning Areas.

# Species

- Steelhead - California Central Valley DPS (Distinct population segment) (*Oncorhynchus mykiss* )
- Chinook salmon - winter-run (*Oncorhynchus tshawytscha*)
- Chinook salmon - spring-run
- Chinook salmon - fall-run
- Chinook salmon - late fall-run
- Green sturgeon - southern DPS (*Acipenser medirostris*)
- Other Species:
  - Sacramento splittail (*Pogonichthys macrolepidotus*)
  - Pacific lamprey (*Entosphenus tridentatus*)



# Structures:

## State Plan of Flood Control (SPFC)

- Fremont Weir
- Sacramento Weir
- Knight's Landing Outfall Gates
- Tisdale Weir
- Moulton Weir
- Colusa Weir
- One Mile Dam (Chico)
- Sycamore Pool (Chico)
- Five Mile Dam (Chico)
- Lindo Channel Diversion Structure (Chico)
- Black Butte Dam (Stony Creek)

# Structures:

## Non-SPFC

- Lisbon Weir (Tule Cannel Yolo Bypass)
- Yolo Bypass Agriculture Crossings (5) (Tule Canal Yolo Bypass)
- Bellota Weir (Calaveras River)
- Weir No 1. (William H. Parks Weir) (Sutter Bypass)
- Giusti Weir (Sutter Bypass)
- Sunset Pumps Diversion Dam (Feather River)

# Improvement Benefits

- Meets CVFPP objectives (e.g., species focused planning, Fish migration).
- Actions will directly contributing to species recovery plans (NMFS 2009).
- Fish migration improvement projects have historically resulted in increased species populations along with ecosystem and economic benefits.

# Next Steps

- Share Draft Snapshot Report with Regional Flood Management Planning (RFMP) effort technical leads and other stakeholders.
- Release Draft Report with Draft Conservation Strategy June 2014.
- Collaborate with federal, State, regional partners and other stakeholders to address barriers within the Systemwide Planning Area where possible.

# Thank You

**“The issue was a fundamentally simple one: What kind of river control theory should people rely on as they thought about flood control in the Valley?”**

*Battling the Inland Sea: Floods, Public Policy, and the Sacramento Valley*

By Robert Lloyd Kelley (1997)

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